Charting Complexity

How Different Chart Types Relate to Visual Complexity

Sean Ru, Kylie Lin, David Rapp, Hui Guan, Cindy Xiong Bearfield

School of Interactive Computing, Georgia Institute of Technology; Department of Psychology, Northwestern University; Department of Computer Science, University of Massachussetts Amherst

Motivating our study: perception and visual complexity

Just as beauty lies in the eye of the beholder, individual differences significantly influence how complex a visualization appears. What one person might find intricate and overwhelming, another might see as simple and elegant. In our study, participants viewed visualizations and rated their complexity.

How we collected our complexity ratings and visualization labels:[1]

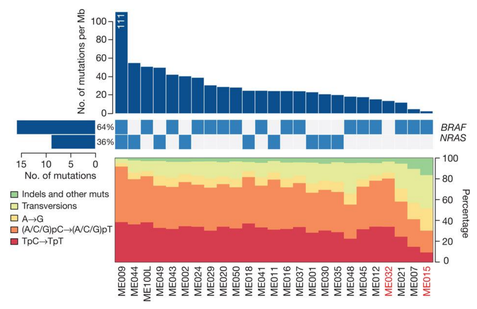


Chart Type:

Grid & Matrix	Bar	Line	Text
Circle	Maps	Trees & Networks	Table
Distribution	Point	Diagrams	Area

Average Complexity Rating:

0 — 100

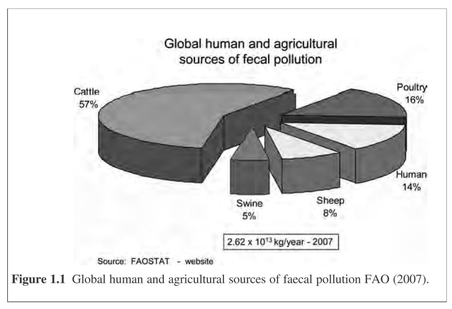


Figure 1.1 Global human and agricultural sources of faecal pollution FAO (2007).

Chart Type:

Grid & Matrix	Bar	Line	Text
Circle	Maps	Trees & Networks	Table
Distribution	Point	Diagrams	Area

Average Complexity Rating:

0 — 100

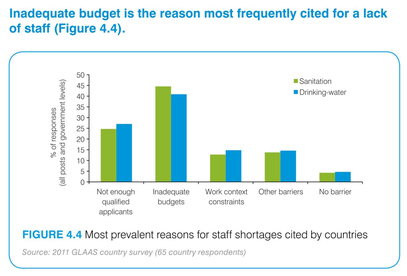


Chart Type:

Grid & Matrix	Bar	Line	Text
Circle	Maps	Trees & Networks	Table
Distribution	Point	Diagrams	Area

Average Complexity Rating:

0 — 100

Chart Type

Stable
- Grid & Matrix
- Bar

Highly Variable
- Line
- Text
- Circle
- Maps

Fluctuating
- Area
- Table

Increase/ Decrease
- Distribution
- Point

Uniform
- Diagrams

Bimodal
- Trees & Networks

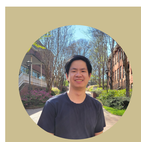
Complexity Rating SD Distribution

Legend
- Q1 (2.21 - 16.22)
- Q2 - Q4 (16.22 - 27.12)
- Q5 (27.13 - 41.93)

Example

Conclusion

People agree more on complexity ratings for Grid & Matrix, Bar, and Line charts, which tend to have lower variability in perceived complexity. Contrarily, we observed more individual differences with Text and Circle charts, which exhibited higher variability in perceived complexity across different viewers.



Sean Ru *lead author*
sru3@gatech.edu
https://seansru.github.io

Looking for PhD Opportunities!

1. Visualizations taken from MASSVIS dataset